

PATENT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

Appellant : **Magdalena Wolska, et al.**
Application Number : **10/713,863** **Confirmation No.** : **1865**
Filed : **November 14, 2003** **Tech Center/AU** : **2176**
Attorney Reference : **128534-00501 (07027356)** **Customer Number** : **26565**
Examiner : **Rachna Singh**
Title : **AUTOMATED EVALUATION OF OVERLY
REPETITIVE WORD USE IN AN ESSAY**

MAIL STOP APPEAL BRIEF
Commissioner for Patents
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Dated: November 6, 2008

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APPEAL BRIEF

Sir:

This brief is submitted under 35 U.S.C. § 134 and is in accordance with 37 C.F.R. Parts 1, 5, 10, 11, and 41, effective September 13, 2004 and published at 60 Fed. Reg. 155 (August 2004). This brief is further to Appellant's Notice of Appeal, and in response to the Advisory Action dated September 30, 2008 for the above-identified application.

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(1) Real Party in Interest:

The real party in interest is assignee Educational Testing Service.

(2) Related Appeals and Interferences:

No other appeals or interferences exist which relate to the present application or appeal.

(3) Status of Claims:

Claims 1, 4, 7-12, 16, and 21-26 are pending, finally rejected, and appealed herein. Claims 2-3, 5-6, 13-15, 17-20, and 27-30 were canceled, and claims 31-54 were withdrawn.

(4) Status of Amendments:

Amendments made to claims 1, 12, 16, and 26 in the amendment after final submitted September 18, 2008 were not entered by the Examiner.

(5) Summary of Claimed Subject Matter:

As an initial matter, it is noted that according to the Patent Office, the concise explanations under this section are for Board convenience, and do not supersede what the claims actually state, 69 Fed. Reg. 155 (August 2004), see page 49976. Accordingly, nothing in this Section should be construed as an estoppel that limits the actual claim language.

As described in the abstract, for example, embodiments of the invention generally pertain to automatic evaluation of essays, including detection of overly repetitive word usage. More specifically, embodiments of the invention identify a word in the essay, and determine at least one feature associated with the word. A probability of the word being used in an overly repetitive manner is determined by mapping the feature to a model, the model having been previously generated by a machine learning application based on at least one human-evaluated essay. When the probability exceeds a threshold, embodiments of the invention annotate the essay to indicate the word is used in an overly repetitive manner.

Claim 1 teaches a method for automatically evaluating an essay to detect a writing style error, excluding misspellings, that comprises electronically receiving an essay on a

computer system (page 8 line 18), and assigning a feature value automatically calculated (page 9 line 14, page 19 line 1) for each feature of essay text segments (excluding essay function words (page 9 lines 17-24, page 11 lines 1-2, page 14 line 9 and 12-15, page 18 line 20)). Further, the feature values are stored on a data storage device accessible by the computer system (page 21 line 14). Next, the feature values are compared with a model configured to identify writing style errors (page 17 lines 9-12). The model includes a decision tree to determine a probability associated with a likelihood of a writing style error, and the decision tree is generated based on a human evaluated essay (page 16 lines 13-16 and 21-23). Finally, the method displays an indication of an identified writing style error (page 3 lines 23-24 and page 20 line 7).

Claim 16 teaches a system for automatically evaluating an essay to detect a writing style error, excluding misspellings, that comprises a computer system configured to electronically receive an essay (page 18 line 18), and a feature extractor configured to assign a feature value (page 9 line 14, page 19 line 1) for each feature for essay text segments (excluding essay function words (page 9 lines 17-24, page 11 lines 1-2, page 14 line 9 and 12-15, page 18 line 20)). Further, a data storage device is connected to the computer system and configured to store the feature values for the text segments (page 21 line 14). Also, a feature analyzer evaluates the essay for a writing style error by comparing the feature values for each text segment with a model generated using a human evaluated essay (page 17 lines 9-12). The model includes a decision tree to determine a probability associated with a likelihood of the writing style error, and the decision tree is generated based on a human evaluated essay (page 16 lines 13-16 and 21-23). Finally, a display presents the evaluated essay that includes an indication of an identified writing style error (page 3 lines 23-24 and page 20 line 7).

(6) Grounds of Rejection to be Reviewed on Appeal:

(a) Whether claims 1, 4, 7-10, 12, 16, and 21-24 and 26 have been properly rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 6,356,864 (Foltz) in view of U.S. Published Application No. 2004/0002994 (Brill), U.S. Published Application No.

2004/0093567 (Schabes), and, effectively, U.S. Published Application No. 2003/0149692 (Mitchell).

(b) Whether claims 11 and 25 have been properly rejected under 35 U.S.C. § 103(a) as unpatentable over Foltz in view of Brill and Schabes and further in view of Mitchell.

(7) Argument:

(a) *Claims 1, 4, 7-10, 12, 16, and 21-24 and 26:*

It is noted that according to the Patent Office, a new ground of rejection in an Examiner's answer should be "rare" and should be levied only in response to such things as newly presented arguments by an Applicant or to address a claim that the Examiner previously failed to address, 69 Fed. Reg. 155 (August 2004), see, e.g., pages 49963 and 49980. Furthermore, a new ground of rejection must be approved by the Technology Center Director or designee and in any case must come accompanied with the initials of the conferees of the appeal conference, id., page 49979. Appellants note that the SPE signed off on the final rejections. Accordingly it is not expected that reopening of prosecution will occur, since the SPE has already had the chance to consider the gravamen of the arguments below and has rejected them.

Appellants respectfully submit that none of the prior art cited by the Examiner discloses, teaches, or suggests all the elements of the appealed claims. Therefore, neither independent claim 1 nor independent claim 16 is obvious based upon any of the cited art. Because claims 1 and 16 are patentable, their dependent claims are patentable at least as dependent from patentable base claims, per MPEP § 2143.03 and *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). Dependent claims 11 and 25 are addressed separately below. The dependent claims are further patentable based on the additional limitations that are added by each such dependent claim. Accordingly, Appellants respectfully assert that the rejections are improper and should be reversed.

Limitations added to the independent claims in the amendment after final filed on September 18, 2008 were not entered by the Examiner. Appellants had amended claims 1 and 16 to more clearly define the invention, e.g. to denote that function words of the essay

are to be excluded when the embodiments of the invention are calculating the feature values. These further limitations were originally in dependent claim 5, which had been previously rejected based on all four of the cited prior art references, Foltz, Brill, Schabes, and Mitchell. Appellants assert the Examiner's decision not to enter the amendment after final constitutes an assertion as detailed in the advisory action that the content of claim 5 (now moved into independent claims 1 and 16) is still rejected based on all four of the prior art references, and appeal accordingly.

Appellants note that Mitchell extracts nouns, verbs, modifiers, prepositions, adjectives, and adverbs for example, and then submits data representations of such constituent parts of each student answer to semantic analysis. See for example paragraphs [0026] and [0048]-[0054] of Mitchell. Mitchell not only fails to teach or suggest but actually teaches away from not considering the function words of the essay, as taught and presently claimed in the present invention. In paragraph [0031] of the published version of the present patent application (U.S. Patent Application Publication 2004/0194036), corresponding to paragraph [0030] on page 9 of the as-filed application, the inventors state "Prior to generating the vector files, function words such as prepositions, articles, and auxiliary verbs, may be removed. For example, the function words (the, that, what, a, an, and, not) have been empirically found to increase the complexity of the analysis without contributing to the reliability of the result." (emphasis added).

The Examiner's assertion that in Mitchell "certain words of the essay are not considered by the assessment tool since they are altered to the reduced variant form" is not entirely correct; such words are converted to the reduced variant form specifically so they can indeed be considered by Mitchell, in contrast to the claimed embodiments of the present invention which intentionally do not consider them. Appellants amended the independent claims in the (unentered) amendment after final to clarify that functional words are excluded from consideration by embodiments of the present invention, to distinguish such exclusion from merely altering words to a root form that then is considered.

(b) Claims 11 and 25:

Dependent claims 11 and 25 warrant particular discussion and separate appellate review. As with the other claims previously described, Appellants respectfully disagree with the Examiner's assertion that Mitchell cures the shortcomings of the other cited references. Appellants assert that Mitchell does not process pronouns (vs. general nouns, which are distinct from pronouns) at all, as taught and claimed by the present invention. Appellants cite for example paragraph [0015] of Mitchell in toto: "Preferably, the natural language processing parses the mark scheme answer into constituent parts such as nouns, verbs, adjectives, adverbs, modifiers and propositions." Appellants note that not only this paragraph but all of Mitchell entirely fails to mention "pronouns".

In summary, as the various embodiments of the present invention include features neither taught nor suggested by the cited prior art references, either separately or together, the obviousness rejections cannot be sustained. Mere untaught possibilities are insufficient to defeat patentability, and a prior art reference must be considered in its entirety, i.e. as a whole. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). Therefore, reversal is respectfully requested.

Conclusion

For the reasons advanced above, Appellants assert the rejected claims are indeed patentable, thus the rejections should be reversed.

Respectfully submitted,

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APPENDIX A – APPEALED CLAIMS

- 1. A method for automatically evaluating an essay to detect at least one writing style error, excluding misspellings, comprising:**

electronically receiving an essay on a computer system;

assigning a feature value for each of one or more features for one or more text segments in the essay, wherein the feature values are automatically calculated by the computer system and wherein function words of the essay are excluded when calculating the feature values;

storing the feature values for the one or more text segments on a data storage device accessible by the computer system;

comparing the feature values for each text segment with a model configured to identify at least one writing style error, wherein the model includes at least one decision tree to determine a probability associated with a likelihood of the at least one writing style error, and wherein the at least one decision tree is generated based on at least one human evaluated essay; and

displaying an indication of an identified writing style error.
- 4. The method of claim 1 wherein the comparison step comprises extracting patterns from the feature values, wherein the patterns are based on the presence or absence of features associated with each word in the essay.**
- 7. The method of claim 1 wherein the feature values comprise the ratio of the evaluated text segment occurrences in the essay to the total number of text segments in the essay.**

8. The method of claim 1 wherein the feature values comprise the average, over all paragraphs of the essay, of the ratio of the number of times the evaluated text segment occurs in a paragraph of the essay, over the total number of text segments in the paragraph.
9. The method of claim 1 wherein the feature values comprise the largest value of the ratio of the number times the evaluated text segment occurs in a paragraph of the essay over the total number of text segments in the paragraph, wherein the ratio is calculated for each paragraph in the essay.
10. The method of claim 1 wherein the feature values comprise the length, measured in characters, of the text segment.
11. The method of claim 1 wherein the feature values comprise a value indicating whether the text segment includes a pronoun.
12. The method of claim 1 wherein the feature values comprise a value representing the interval distance between consecutive text segment occurrences determined by calculating the number of intervening characters.
16. A system for automatically evaluating an essay to detect at least one writing style error, excluding misspellings, comprising:
a computer system configured to electronically receive an essay;

a feature extractor configured to assign a feature value for each of one or more features for one or more text segments in the essay wherein function words of the essay are excluded when calculating the feature values;

a data storage device, connected to the computer system, configured to store the feature values for the one or more text segments;

a feature analyzer configured to evaluate the essay for at least one writing style error by comparing the feature values for each of one or more text segments with a model generated using at least one human evaluated essay, wherein the model includes at least one decision tree to determine a probability associated with a likelihood of the at least one writing style error, and wherein the at least one decision tree is generated based on at least one human evaluated essay; and

a display for presenting the evaluated essay, wherein the evaluated essay includes an indication of at least one identified writing style error.

21. The system of claim 16 wherein the feature extractor comprises an essay ratio calculator configured to generate a value representing the ratio of the number of times the evaluated text segment occurs in the essay to the total number of text segments in the essay.

22. The system of claim 16 wherein the feature extractor comprises an average paragraph ratio calculator configured to generate a value representing the average over all paragraphs in the essay of the ratio of the number of times the evaluated text segment occurs in a paragraph of the essay over the total number of text segments in the paragraph.

- 23. The system of claim 16 wherein the feature extractor comprises a highest paragraph ratio calculator configured to generate a value representing the largest ratio of the number of times the evaluated text segment occurs in a paragraph of the essay over the total number of text segments in the paragraph.**
- 24. The system of claim 16 wherein the feature extractor comprises a length calculator configured to generate a value representing the length, measured in characters, of the text segment.**
- 25. The system of claim 16 wherein the feature extractor comprises an identifier to determine whether the text segment includes a pronoun.**
- 26. The system of claim 16 wherein the feature extractor comprises a distance calculator configured to generate a value representing the distance measured in characters between consecutive text segment occurrences.**

APPENDIX B – EVIDENCE

None (this sheet made necessary by 69 Fed. Reg. 155 (August 2004), page 49978).

APPENDIX C – RELATED PROCEEDINGS

None (this sheet made necessary by 69 Fed. Reg. 155 (August 2004), page 49978).